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1 AAAAAGAAAG GAAGAAAATG GAAATACAAC AAACACACCG CAAAATCAAT
51 CGCCCTCTGG TTTCTCTCGC TTTAGTAGGA GCATTAGTCA GCATCACACC
101 GCAACAAAGT CATGCCGCCT TTTTCACAAC CGTGATCATT CCAGCCATTG
151 TTGGGGGTAT CGCTACAGGC ACCGCTGTAG GAACGGTCTC AGGGCTTCTT
201 AGCTGGGGGC TCAAACAAGC CGAAGAAGCC AATAAAACCC CAGATAAACC
251 CGATAAAGTT TGGCGCATT C AAGCAGGAAA AGGCTTTAAT GAATTCCCTA
301 ACAAGGAATA CGACTTATAC AGATCCCTTT TATCCAGTAA GATTGATGGA
351 GGTGTTGGGATT GGGGGAATGC CGCTAGGCAT TATTGGGTCA AAGGCGGGCA
401 ACAGAATAAG CTTGAAGTGG ATATGAAAGA CGCTGTAGGG ACTTATACCT
451 TATCAGGGCT TAGAACTTT ACTGGTGGGG ATTTAGATGT CAATATGCAA
501 AAAGCCACTT TACGCTTGGG CCAATTCAAT GGCAATTCTT TTACAAGCTA
551 TAAGGATAGT GCTGATCGCA CCACGAGAGT GATTTCAACG CTAAAAATAT
601 CTCAATTGAT AATTTTGCAG AAATCAACAA CTCGTGTGGG TTCTGGAGCC
651 GGGAGGAAAG CCAGCTCTAC GGTTTTGACT TTGCAAGCTT CAGAAGGGAT
701 CACTAGCGAT AAAAACGCTG AAATTTCTCT TTATGATGGT GCCACGCTCA
751 ATTTGGCTTC AAGCAGCGTT AAATTAATGG GTAATGTGTG GATGGGCCGT
801 TTGCAATACG TGGGAGCGTA TTTGGCCCCT TCATACAGCA CGATAAACAC
851 TTCAAAAGTA ACAGGGGAAG TGAATTTTAA CCACCTCACT GTTGGCGATA
901 AAAACGCCGC TCAAGCGGGC ATTATCGCTA ATAAAAAGAC TAATATTGGC
951 AACTGGATT TGTGGCAAAG CGCCGGGTTA AACATTATCG CTCCTCCAGA
1001 AGGTGGCTAT AAGGATAAAC CCAATAATAC CCCTTCTCAA AGTGGTGCTA
1051 AAAACGACAA AAATGAAAGC GCTAAAAACG ACAAACAAGA GAGCAGTCAA
1101 AATAATAGTA AACTCAGGT CATTAACCCA CCCAATAGTG CGCAAAAAAC
1151 AGAAGTTCAA CCCACGCAAG TCATTGATGG GCCTTTTGCG GCGGCAAAG
1201 ACACGGTTGT CAATATCAAC CGCATCAACA CTAACGCTGA TGGCAGGATT
1251 AGAGTGGGAG GGTTTAAAGC TTCTCTTACC ACCAATGCGG CTCATTGCA
1301 TATCGGCAAA GCGGGTGTCA ATCTGTCCAA TCAAGCGAGC GGGCGCTCTC

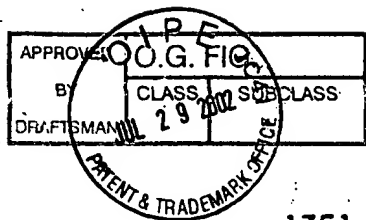
FIG. 1A

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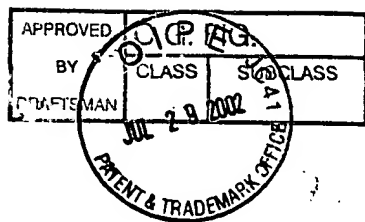
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1351 TTATAGTGGA AAATCTAACT GGGAATATCA CCGTTGATGG GCCTTTAAGA
1401 GTGAATAATC AAGTGGGTGG CTATGCTTTG GCAGGATCAA GCGCGAATTT
1451 TGAGTTTAAAG GCTGGTACGG ATACCAAAAA CGGCACAGCC ACTTTTAATA
1501 ACGATATTAG TCTGGGAAGA TTTGTGAATT TAAAGGTGGA TGCTCATACA
1551 GCTAATTTTA AAGGTATTGA TACGGGTAAT GGTGGTTTCA ACACCTTAGA
1601 TTTTAGTGGC GTTACAGACA AAGTCAATAT CAACAAGCTC ATTACGGCTT
1651 CCACTAATGT GGCCGTTAAA AACTTCAACA TTAATGAATT GATTGTAAAA
1701 ACCAATGGGA TAAGTGTGGG GGAATATACT CATTTTAGCG AAGATATAGG
1751 CAGTCAATCG CGCATCAATA CCGTGCGTTT GGAAACTGGC ACTAGGTCAC
1801 TTTTCTCTGG GGGTGTTAAA TTAAAGGTG GCGAAAAAT GGTTATAGAT
1851 GAGTTTTACT ATAGCCCTTG GAATTATTTT GACGCTAGAA ATATTAAAAA
1901 TGTGAAATC ACCAATAAAC TTGCTTTTGG ACCTCAAGGA AGTCCTTGGG
1951 GCACATCAAA ACTTATGTTC AATAATCTAA CCCTAGGTCA AAATGCGGTC
2001 ATGGATTATA GCCAATTTTT AAATTAAACC ATTCAAGGGG ATTTCATCAA
2051 CAATCAAGGC ACTATCAACT ATCTGGTCCG AGGTGGGAAA GTGGCAACCT
2101 TAAGCGTAGG CAATGCAGCA GCTATGATGT TTAATAATGA TATAGACAGC
2151 GCGACCGGAT TTTACAAACC GTCATCAAG ATTAACAGCG CTCAAGATCT
2201 CATTAAAAAT ACAGAACATG TTTTATTGAA AGCGAAAATC ATTGGTTATG
2251 GTAATGTTTC TACAGGTACC AATGGCATTG GTAATGTAA TCTAGAAGAG
2301 CAATTCAAAG AGCGCCTAGC CCTTTATAAC AACAATAACC GCATGGATAC
2351 TTGTGTGGTG CGAAATACTG ATGACATTAA AGCATGCGGT ATGGCTATCG
2401 GCGATCAAAG CATGGTGAAC AACCTGACA ATTACAAGTA TCTTATCGGT
2451 AAGGCATGGA AAAATATAGG GATCAGCAAA ACAGCTAATG GCTCTAAAAT
2501 TTCGGTGTAT TATTTAGGCA ATTCTACGCC TACTGAGAAT GGTGGCAATA
2551 CCACAAATTT ACCCACAAC AGCACTAGCA ATGCACGTTC TGCCAACAAC
2601 GCCCTTGAC AAAACGCTCC TTTCGCTCAA CCTAGTGCTA CTCCTAATTT
2651 AGTCGCTATC AATCAGCATG ATTTTGGCAC TATTGAAAGC GTGTTTGAAT

FIG. 1B

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2701 TGGCTAACCG CTCTAAAGAT ATTGACACGC TTTATGCTAA CTCAGGCGCT
2751 CAAGGCAGGG ATCTCTTACA AACCTTATTG ATTGATAGCC ATGATGCGGG
2801 TTATGCCAGA AAAATGATTG ATGCTACAAG CGCTAATGAA ATCACCAAGC
2851 AATTGAATAC GGCCACTACC ACTTTAAACA ACATAGCCAG TTTAGAGCAT
2901 AAAACCAGCG GCTTACAAAC TTTGAGCTTG AGTAATGCGA TGATTTTAAA
2951 TTCTCGTTTA GTCAATCTCT CCAGGAGACA CACCAACCAT ATTGACTCGT
3001 TCGCCAAACG CTTACAAGCT TTAAAAGACC AAAAATTCGC TTCTTTAGAA
3051 AGCGCGGCAG AAGTGTTGTA TCAATTTGCC CCTAAATATG AAAAACCTAC
3101 CAATGTTTGG GCTAACGCTA TTGGGGGAAC GAGCTTGAAT AATGGCTCTA
3151 ACGCTTCATT GTATGGCACA AGCGCGGGCG TAGACGCTTA CCTTAACGGG
3201 CAAGTGGAAG CCATTGTGGG CGGTTTTGGA AGCTATGGTT ATAGCTCTTT
3251 TAATAATCGT GCGAACTCCC TTAACCTCTGG GGCCAATAAC ACTAATTTTG
3301 GCGTGTATAG CCGTATTTTA ACCAACCAGC ATGAATTTGA CTTTGAAGCT
3351 CAAGGGGCAC TAGGGAGCGA TCAATCAAGC TTGAATTTCA AAAGCGCTCT
3401 ATTACAAGAT TTGAATCAAA GCTATCATT CTTAGCCTAT AGCGCTGCAA
3451 CAAGAGCGAG CTATGGTTAT GACTTCGCGT TTTTATAGGAA CGCTTTAGTG
3501 TTAACCAAC GCGTGGGTGT GAGCTATAAC CATTTAGGTT CAACCAACTT
3551 TAAAAGCAAC AGCACCAATC AAGTGGCTTT GAAAAATGGC TCTAGCAGTC
3601 AGCATTTATT CAACGCTAGC GCTAATGTGG AAGCGCGCTA TTATTATGGG
3651 GACACTTCAT ACTTCTACAT GAATGCTGGA GTTTTACAAG AGTTCGCTCA
3701 TGTTGGCTCT AATAACGCCG CGTCTTTAAA CACCTTTAAA GTGAATGCCG
3751 CTCGCAACCC TTAAATACC CATGCCAGAG TGATGATGGG TGGGGAATTA
3801 AAATTAGCTA AAGAAGTGTT TTTGAATTTG GCGTGTGTTT ATTTGCACAA
3851 TTTGATTTCC AATATAGGCC ATTTGCTTC CAATTTAGGA ATGAGGTATA
3901 GTTTCTAAAT ACCGCTCTTA AACCCATGCT CAAAGCATGG GTTTGAAATC
3951 TTACAAAACA

FIG. 1C

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Docket No. CHIR-0157

Serial No.: 09/360,685

Title: Helicobacter Pylori Cag Antigen Proteins Useful For Vaccines And Diagnostics

Inventor(s): Covacci et al.

Sheet 4 of 14

Felicity E. Groth (215) 557-5908

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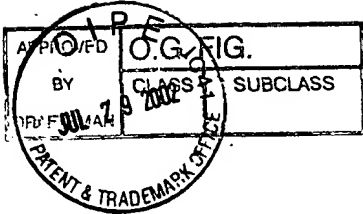
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 101 YRSLSSKID GGWDWGNAAR HYWVKGGQQN KLEVDMKDAV GTYTLSGLRN
 151 FTGGDLVNM QKATLRLGQF NGNSFTSYKD SADRTTRVIS TLKISQLIIL
 201 QKSTTRVGS G AGRKASSTVL TLQASEGITS DKNAEISLYD GATLNLASSS
 251 VKLMGNVWVG RLQYVGAYLA PSYSTINTSK VTGEVNFNHL TVGDKNAAQA
 301 GIIANKKTN I GTLDLWQSAG LNIIAPPEGG YKDKPNNTPS QSGAKNDKNE
 351 SAKNDKQESS QNNSNTQVIN PPNSAQKTEV QPTQVIDGPF AGGKDTVVNI
 401 NRINTNADGT IRVGGFKASL TTNAAHLHIG KGGVNL SNQA SGRSLIVENL
 451 TGNITVDGPL RVNNQVGGYA LAGSSANFEF KAGTDTKNGT ATFNNDISLG
 501 RFVNLKVDAH TANFKGIDTG NGGFNTLDFS GVTDKVNINK LITASTNVA V
 551 KNFNINELIV KTNGISVGEY THFSEDIGSQ SRINTVRLET GTRSLFSGGV
 601 KFKGGEKLV I DEFYYSPWNY FDARNIKNVE ITNKLAFGPQ GSPWGT SKLM
 651 FNNLT LGQNA VMDYSQFLNL TIQGDFINNO GTINYLV RGG KVATLSVGNA
 701 AAMMFNNDID SATGFYKPLI KINSAQDLIK NTEHVLLKAK IIGYGNVSTG
 751 TNGISNVNLE EQFKERLALY NNNNRMDTCV VRNTDDIKAC GMAIGDQSMV
 801 NNPDNYKYLI GKAWKNIGIS KTANGSKISV YYLGNSTPTE NGGNTTNLPT
 851 NTTSNARSAN NALAQNAPFA QPSATPNLVA INQHDFGTIE SVFELANRSK
 901 DIDTLYANS G AQGRDLLQTL LIDSHDAGYA RKMIDATSAN EITKQLNTAT
 951 TTLNNIASLE HKTSGLQTLS LSNAMILNSR LVNLSRRHTN HIDSFAKRLQ
 1001 ALKDQKFASL ESAAEVLYQF APKYEKPTNV WANAIGGTSL NNGSNASLYG
 1051 TSAGVDAYLN GQVEAIVGGF GSYGYSSFNN RANSLNSGAN NTNFGVYSRI
 1101 LTNQHEFD FE AQGALGSDQS SLNFKSALLQ DLNQSYHYLA YSAATRASYG
 1151 YDFAFFRNAL VLKPSVGVSY NHLGSTNFKS NSTNQVALKN GSSSQHLFNA
 1201 SANVEARYYY GDTSYFYMNA GVLQEF AHVG SNNAASLNTF KVNAARNPLN
 1251 THARVMMGGE LKLAKEVFLN LGVVYLHNL I SNIGHFASNL GMRYSF

FIG. 2

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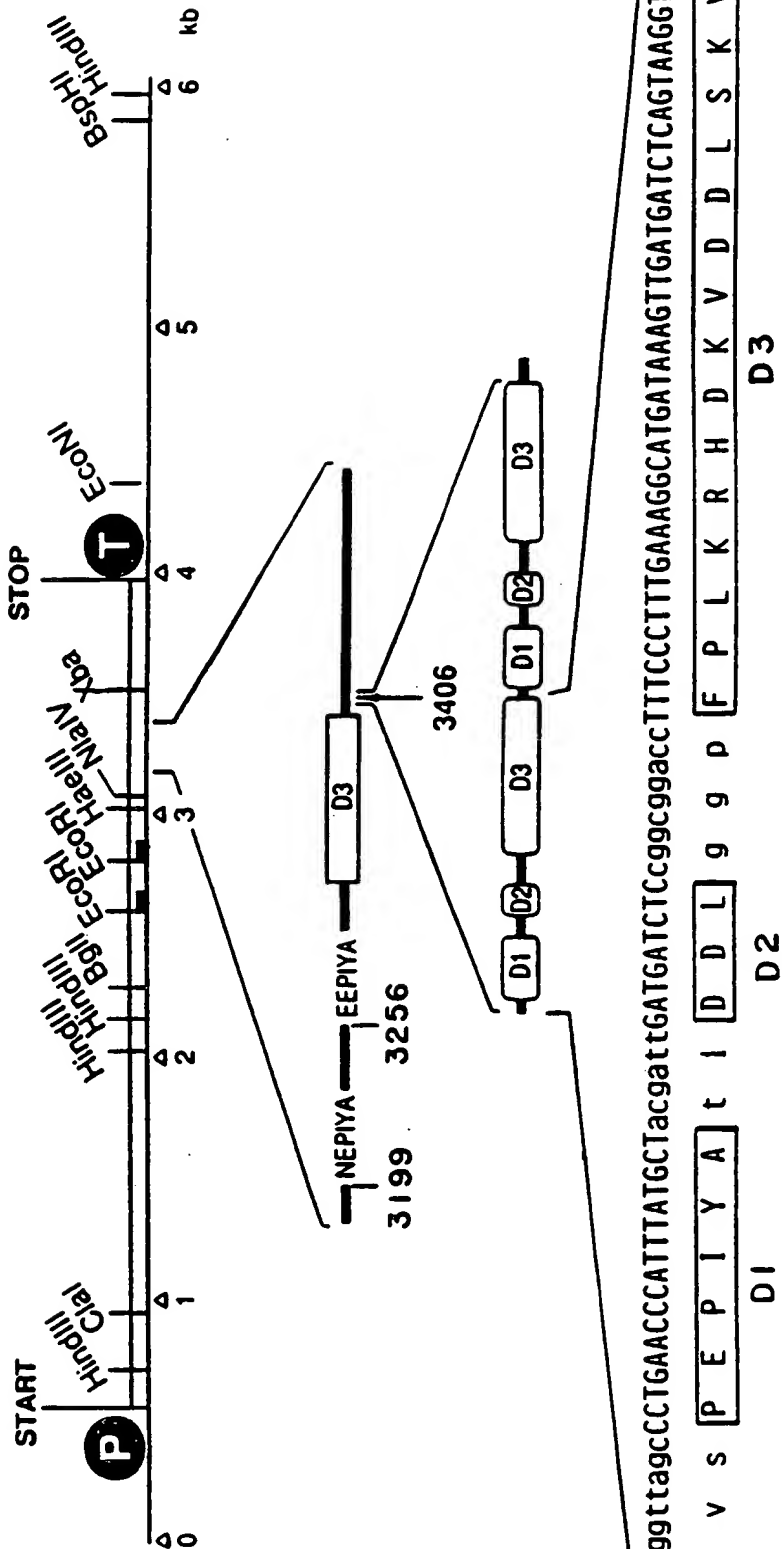


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FIG. 3

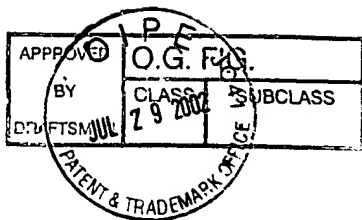
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999cgatcggttagcCCTGAACCCATTATGCTacgattGATGATCICcg9cg9accTTCCCTTTGAAGGCATGATAAAGTTGATGATCTCAGTAAGGTA

g r s v s P E P I Y A t i D D L G G P F P L K R H D K V D D L S K V



Docket No. CHIR-0157

Serial No.: 09/360,685

Title: Helicobacter Pylori Cai Antigen Proteins Useful For Vaccines And
Diagnostics

Inventor(s): Covacci et al.

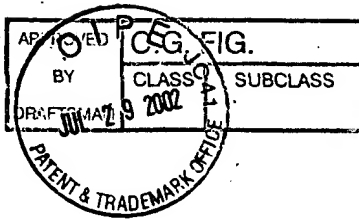
Sheet 6 of 14

Felicity E. Groth (215) 557-5908

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CTCCATTTTAAGCAACTCCATAGACCACTAAAGAACTTTTTTTGAGGCTATCTTTGAAA
GCTTAATTATACATGCTATAGTAAGCATGACACACAAACCAAATTTTTTAGAACGCTT
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CTTTTTTCAATATTAATAATGATTAATGAAAAAAAAAAAAAATGCTTGATATTGTTGTAT
TTGACACTAACAGATACCGATAGGTATGAACTAGGTATAGTAAGGAGAAACAATGACT
M T
AATAATCTTCAAGTAGCTTTTTCTTAAAGTTGATAACGCTGTCGCTTCATACGATCCTGAT
23 N N L Q V A F L K V D N A V A S Y D P D
CAATTAAGGGAAGAATACTCCAATAAAGCGATCAAAAATCCTACCAAAAAGAATCAGTAT
63 Q L R E E Y S N K A I K N P T K K N Q Y
GAATCTTCCACAAAGAGCTTTCAGAAATTTGGGGATCAGCGTTACCGAATTTTCACAAGT
103 E S S T K S F Q K F G D Q R Y R I F T S
GAAAATATCATACAACCCCTATCCTTGATGATAAAGAGAAAGCGGAGTTTTTGAAATCT
143 E N I I Q P P I L D D K E K A E F L K S
ATGGGCGTGTTTGATGAGTCCTTGAAAGAAAGGCAAGAAGCAGAAAAAATGGAGAGCCT
183 M G V F D E S L K E R Q E A E K N G E P
GATGTCAAAGAAGCAATCAATCAAGAACCAGTTCCCATGTCCAACCAGATATAGCCACT
223 D V K E A I N Q E P V P H V Q P D I A T
AATTTTTCTAAATTCACCTCTTGGCGATATGGAAATGTTAGATGTTGAGGGAGTCGCTGAC
263 N F S K F T L G D M E M L D V E G V A D
TTAATGGGGAGTCATAATGGCATAGAACCTGAAAAAGTTTCATTGTTGTATGGGGGCAAT
303 L M G S H N G I E P E K V S L L Y G G N
ACAATGTGGCTACAATAATTAATGTGCATATGAAAAACGGCAGTGGCTTAGTCATAGCA
343 N N V A T I I N V H M K N G S G L V I A
GGCTCACAACGAGCATTAAAGTCAAGAAGAGATCCAAAACAAAATAGATTTTCATGGAATTT
383 G S Q R A L S Q E E I Q N K I D F M E F
ACTGAGATTAAAGATTTCCAAAAAGACTCTAAGGCTTATTTAGACGCCCTAGGGAATGAT
423 T E I K D F Q K D S K A Y L D A L G N D
AATGGGGATTTGAGCTACACTCTCAAAGATTATGGGAAAAAAGCAGATAAAGCTTTAGAT
463 N G D L S Y T L K D Y G K K A D K A L D
TATTCTAATTTCAATACACCAACGCCTCCAAGAATCCCAATAAGGGTGTAGGCGTTACG

FIG. 4A



Docket No. CHIR-0157

Serial No.: 09/360,685

Title: Helicobacter Pylori: Cai Antigen Proteins Useful For Vaccines And
Diagnostics

Inventor(s): Covacci et al.

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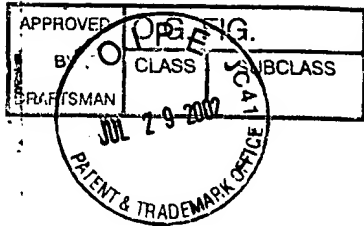
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TTGTTAATTGTGGGTAAAAATGTGAATCGTCCTAGCCTTTAGACGCCTGCAACGATCGGG 360
AATGAGAATGTTCAAAGACATGAATTGACTACTCAAGCGTGTAGCGATTTTTAGCAGTCT 480
AACGAAACCATTGACCAACAACCACAAACCGAAGCGGCTTTTAACCCGCAGCAATTTATC 600
N E T I D Q Q P Q T E A A F N P Q Q F I
CAAAAACCAATCGTTGATAAGAACGATAGGGATAACAGGCAAGCTTTTGAAGGAATCTCG 720
Q K P I V D K N D R D N R Q A F E G I S
TTTTCAGACTTTATCAATAAGAGCAATGATTTAATCAACAAAGACAATCTCATTGATGTA 840
F S D F I N K S N D L I N K D N L I D V
TGGGTGTCCCATCAAAACGATCCGTCTAAATCAACACCCGATCGATCCGAAATTTTATG 960
W V S H Q N D P S K I N T R S I R N F M
GCCAAACAATCTTTTGAGGAATCATTATAGGGAATCAAATCCGAACGGATCAAAAGTTC 1080
A K Q S F A G I I I G N Q I R T D Q K F
ACTGGTGGGGATTGGTTGGATATTTTTCTCTCATTATATTTGACAAAAACAATCTTCT 1200
T G G D W L D I F L S F I F D K K Q S S
ACCACCACCGACATACAAGGCTTACCGCTGAAGCTAGAGATTTACTTGATGAAAGGGG 1320
T T T D I Q G L P P E A R D L L D E R G
ATTGATCCCAATTACAAGTTCAATCAATTATTGATTCACAATAACGCTCTGTCTTCTGTG 1440
I D P N Y K F N Q L L I H N N A L S S V
GGTGGTCCTGGAGCTAGGCATGATTGGAACGCCACCGTTGGTTATAAAGACCAACAAGGC 1560
G G P G A R H D W N A T V G Y K D Q Q G
GGTGGTGAGAAAGGGATTAACAACCTAGTTTTTATCTCTACAAAGAAGACCAACTCACA 1680
G G E K G I N N P S F Y L Y K E D Q L T
CTTGACAAAATAATGCTAAATTAGACAACCTTGAGCGAGAAAGAGAAGGAAAAATTCCGA 1800
L A Q N N A K L D N L S E K E K E K F R
CGTATTGCTTTTGTTCCTAAAAAGACACAAACATTCAGCTTTAATTACTGAGTTTGGT 1920
R I A F V S K K D T K H S A L I T E F G
AGGGAGAAAAATGTTACTCTTCAAGGTAGCCTAAAACATGATGGCGTGATGTTTGTGAT 2040
R E K N V T L Q G S L K H D G V M F V D
AATGGCGTTTCCCATTTAGAAGTAGGCTTTAACAAGGTAGCTATCTTTAATTTGCCTGAT 2160

FIG. 4B

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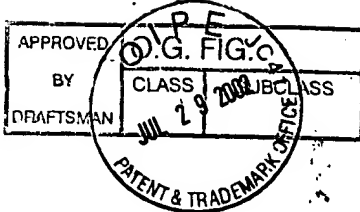
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543 L N N L A I T S F V R R N L C D K L T T
GAATTGGTTGGAACAACTTTAACTTCAATAAAGCTGTAGCTGACGCTAAAAACACAGGC
583 E L V G K T L N F N K A V A D A K N T G
CATTTAGAGAAAGAAGTAGAGAAAAAATTGGAGAGCAAAAGCGGCAACAAAATAAAATG
623 H L E K E V E K K L E S K S G N K N K M
GCTAATAGAGACGCAAGAGCAATCGCTTACGCTCAGAATCTTAAAGGCATCAAAAGGGAA
663 A N R D A R A I A Y A Q N L K G I K R E
GAATTCAAAAATGGCAAAAATAAGGATTTTCAGCAAGGCAGAAGAACTAAAGCCCTT
703 E F K N G K N K D F S K A E E T L K A L
AATGCAGCTTTGAATGAATTCAAAATGGCAAAAATAAGGATTTTCAGCAAGGTAACGCAA
743 N A A L N E F K N G K N K D F S K V T Q
AAAGTTGATAATCTCAATCAAGCGGTATCAGTGGCTAAAGCAACGGGTGATTTTCAGTAGG
783 K V D N L N Q A V S V A K A T G D F S R
CAAAAAAATGAAAGTCTCAATGCTAGAAAAAATCTGAAATATATCAATCCGTTAAGAAT
823 Q K N E S L N A R K K S E I Y Q S V K N
AAAACTTTTCGGACATCAAGAAAGAGTTGAATGCAAACTTGGAAATTTCAATAACAAT
863 K N F S D I K K E L N A K L G N F N N N
CAAGCAGCTAGCCTTGAAGAACCATTTCAGCTCAAGTTGCTAAAAAGGTAAATGCAAAA
903 Q A A S L E E P I Y A Q V A K K V N A K
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943 P L K R H D K V D D L S K V G L S R N Q
TTTGGCAATCTAGAGCAACGATAGACAAGCTCAAAGATTCTACAAAACACAATCCCATG
983 F G N L E Q T I D K L K D S T K H N P M
TACGCTACTAACAGCCACATACGCATTAATAGCAATATCAAAAATGGAGCAATCAATGAA

FIG. 4C

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N G V S H L E V G F N K V A I F N L P D
AAAGGATTGTCCCCACAAGAAGCTAATAAGCTTATCAAAGATTTTTTGAGCAGCAACAAA 2280
K G L S P Q E A N K L I K D F L S S N K
AATTATGATGAAGTGAAAAAGCTCAGAAAGATCTTGAAAAATCTCTAAGGAAACGAGAG 2400
N Y D E V K K A Q K D L E K S L R K R E
GAAGCAAAAGCTCAAGCTAACAGCCAAAAAGATGAGATTTTTGCGTTGATCAATAAAGAG 2520
E A K A Q A N S Q K D E I F A L I N K E
TTGTCTGATAAACTTGAAAATGTCAACAAGAATTTGAAAGACTTTGATAAATCTTTTGAT 2640
L S D K L E N V N K N L K D F D K S F D
AAAGGTTGCGTGAAAGATTTAGGTATCAATCCAGAATGGATTTCAAAAGTTGAAAACCTT 2760
K G S V K D L G I N P E W I S K V E N L
GCAAAAAGCGACCTTGAAAATTCGGTTAAAGATGTGATCATCAATCAAAAGGTAACGGAT 2880
A K S D L E N S V K D V I I N Q K V T D
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V E Q A L A D L K N F S K E Q L A Q Q A
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N N N G L K N E P I Y A K V N K K K A G
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E L A Q K I D N L N Q A V S E A K A G F
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FIG. 4D

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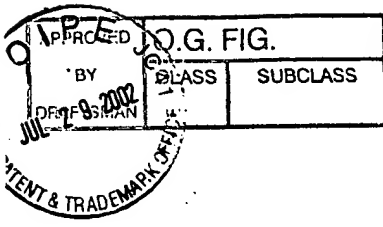
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 TGCGAAACATTCAAATAGCCTTGTTGTTTCAGGGCATTGTCATAAGCGTTGGATTGG
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 TTGAAAAATCCAAAGCCTCTAAGCCAAATTGCTTGATCGTAGTGGGGTCTTTAGTG
 AGGCTTTTTTAAACGCTAAACCCTCCACACCGCTATCAAAAACGCCTATTTTCATG
 TCTTCATTGTCCTTAGTTTGTTGCATTTTAGAATAGACAAAGCTT 5925

FIG. 4E



Docket No. CHIR-0157
Title: Helicobacter Pylori Cai Antigen Proteins Useful For Vaccines And
Diagnostics
Inventor(s): Covacci et al.
Sheet 11 of 14

Serial No.: 09/360,685
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E K A T G M L T Q K N P E W L K L V N D K
AACCAGAAGAATATGAAAGATTATTCTGATTGTTCAAGTTTTCCACCAAGTTGAACAATGCT 3840
N Q K N M K D Y S D S F K F S T K L N N A
TCTTATTACTGCTTGGCGAGAGAAAATGCGGAGCATGGAATCAAGAACGTTAATACAAAAGGT 3960
S Y Y C L A R E N A E H G I K N V N T K G
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ACACTTTTTTAATTTAATGGGATTAATTAGGGATTTTATTTTTTCATTCATTAAGTTTAAAAAT 5880

FIG. 4F

APPROVED	Q.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Docket No. CHIR-0157
 Title: Helicobacter Pylori Cai Antigen Proteins Useful For Vaccines And
 Diagnostics
 Inventor(s): Covacci et al.
 Sheet 12 of 14

Serial No.: 09/360,685
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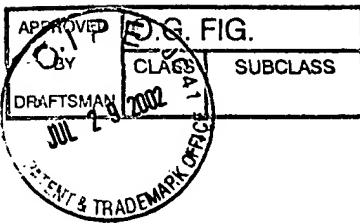
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      70              90              110
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A K E I K F S D S A R N L L F E G V R Q
      130             150             170
CTCCATGACGCTGTCAAAGTAACCATGGGGCCAAGAGGCAGGAATGTATTGATCCAAAAA
L H D A V K V T M G P R G R N V L I Q K
      190             210             230
AGCTATGGCGCTCCAAGCATCACCAAAGACGGCGTGAGCGTGGCTAAAGAGATTGAATTA
S Y G A P S I T K D G V S V A K E I E L
      250             270             290
AGTTGCCAGTAGCTAACATGGGGCGCTCAACTCGTTAAAGAAGTAGCGAGCAAACCGCT
S C P V A N M G A Q L V K E V A S K T A
      310             330             350
GATGCTGCCGGCGATGGCAGCACCACAGCGACCGTGCTAGCTTATAGCATTTTTAAAGAA
D A A G D G T T T A T V L A Y S I F K E
      370             390             410
GGTTTGAGGAATATCACGGCTGGGGCTAACCTATTGAAGTGAAACGAGGCATGGATAAA
G L R N I T A G A N P I E V K R G M D K
      430             450             470
GCTGCTGAAGCGATCATTAAATGAGCTTAAAAAGCGAGCAAAAAAGTAGGCGGTAAAGAA
A A E A I I N E L K K A S K K V G G K E
      490             510             530
GAAATCACCCAAGTGGCGACCATTTCTGCAAACTCCGATCACAATATCGGGAAACTCATC
E I T Q V A T I S A N S D H N I G K L I
      550             570             590
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A D A M E K V G K D G V I T V E E A K G
      610             630             650
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I E D E L D V V E G M Q F D R G Y L S P
  
```

FIG. 5A



Docket No. CHIR-0157

Serial No.: 09/360,685

Title: Helicobacter Pylori Cai Antigen Proteins Usef For Vaccines And

Diagnostics

Inventor(s): Covacci et al.

Sheet 13 of 14

Felicity E. Groth (215) 557-5908

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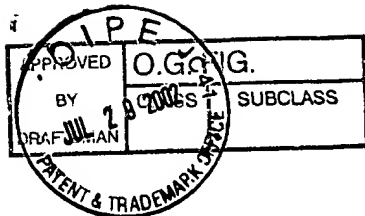
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670 690 710
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Y F V T N A E K M T A Q L D N A Y I L L
730 750 770
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T D K K I S S M K D I L P L L E K T M K
790 810 HindIII
GAGGGCAAACCGCTTTTAATCATCGCTGAAGACATTGAGGGCGAAGCTTTAACGACTCTA
E G K P L L I I A E D I E G E A L T T L
850 870 890
GTGGTGAATAAATTAAGAGGCGTGTGAATATCGCAGCGGTAAAGCTCCAGGCTTTGGG
V V N K L R G V L N I A A V K A P G F G
910 930 950
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D R R K E M L K D I A I L T G G Q V I S
970 990 1010
GAAGAATTGGGCTTGAGTCTAGAAAACGCTGAAGTGGAGTTTTTAGGCAAAGCTGGAAGG
E E L G L S L E N A E V E F L G K A G R
1030 1050 1070
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I V I D K D N T T I V D G K G H S D D V
1090 1110 1130
AAAGACAGAGTCGCGCAGATCAAAACCCAAATTGCAAGTACGACAAGCGATTATGACAAA
K D R V A Q I K T Q I A S T T S D Y D K
1150 1170 1190
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E K L Q E R L A K L S G G V A V I K V G
1210 1230 1250
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A A S E V E M K E K K D R V D D A L S A
1270 1290 1310
ACTAAAGCGGCGGTTGAAGAAGGCATTGTGATTGGTGGCGGTGCGGCTCTCATTGCGCG
T K A A V E E G I V I G G G A A L I R A

FIG. 5B



Docket No. CHIR-0157

Serial No.: 09/360,685

Title: Helicobacter Pylori Cag Antigen Proteins Useful For Vaccines And
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Inventor(s): Covacci et al.

Sheet 14 of 14

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1390	1410	1430
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R A I K A P L A Q I A I N A G Y D G G V		
1450	1470	1490
GTCGTGAATGAAGTAGAAAAACACGAAGGGCATTTTGGTTTTAACGCTAGCAATGGCAAG		
V V N E V E K H E G H F G F N A S N G K		
1510	1530	1550
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Y V D M F K E G I I D P L K V E R I A L		
1570	1590	1610
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Q N A V S V S S L L L T T E A T V H E I		
1630	1650	1670
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K E E K A T P A M P D M G G M G G M G G		
1690	1710	1730
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M G G M M •		
1750	1770	1790
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1810	1830	
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FIG. 5C